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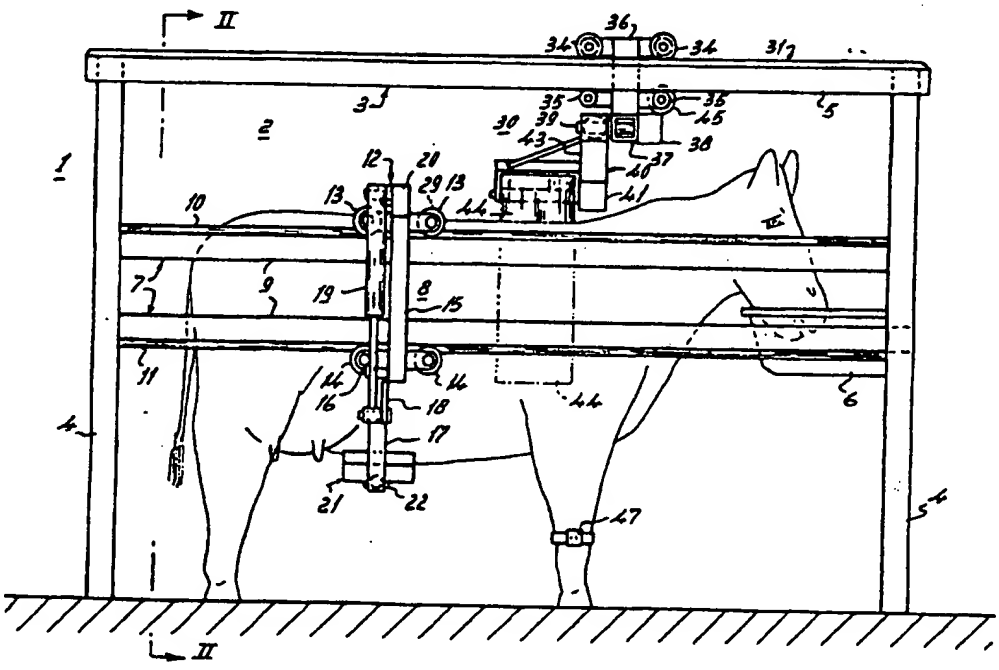

(57) Abstract

The invention relates to a construction including an accommodation (1) for animals, such as cows, which accommodation (1) comprises a massage member (8) and a brushing member (30) for massaging respectively brushing the animals. The construction further comprises a longitudinal guide means (7, 31) across which the massage member (8) and/or the brushing member (30) can be moved in the longitudinal direction of the animal.

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A CONSTRUCTION INCLUDING AN ACCOMMODATION FOR ANIMALS

The invention relates to a construction including an accommodation for animals, such as cows.

Such a construction is known.

It is important, however, that the animals feel at ease in the accommodation, as this may increase the milk production and reduce the percentage of diseases of the animals. Therefore, the invention aims at arranging the accommodation in such a manner that the animals feel at ease there.

In accordance with the invention, this will be achieved in that the accommodation comprises a massage member and a brushing member for automatically massaging or brushing an animal simultaneously and/or alternately. Massaging the animal stimulates the milk yield, while the skin of the animal is kept clean by brushing. According to an inventive feature, the massage member is designed in such a way that the animal is massaged automatically at its upper side and/or underside and/or rear side. Therefore, the invention also relates to a construction including an accommodation for animals, such as cows, characterized in that the accommodation comprises a massage member which is designed in such a way that the animal is massaged automatically at its upper side and/or underside and/or rear side during a time which is regulated by the computer.

According to an inventive feature, the accommodation comprises at least one milk box and the massage member and/or the brushing member are/is disposed on the milk box or near thereto in such a manner that it will be possible to massage or brush the rear end of the animal. In this way

it will be possible to milk the animal during massaging or brushing. Therefore, the invention further relates to a construction including an accommodation for animals, such as cows, characterized in that the accommodation comprises at least one milk box, while the massage member and the brushing member are disposed on the milk box or near thereto in such a manner that it will be possible to massage or brush the rear end of the animal.

In order to render the massage as pleasant as possible for the animal, in accordance with a further inventive feature, the massage member comprises a massage element which is made of flexible material, such as synthetic material or rubber. In accordance with a further inventive feature, it will be possible to stimulate an animal additionally in that the massage and/or the brushing member comprise(s) a device by means of which it will be possible, in a cold season, to supply automatically warm air, water or oil during massaging and/or brushing.

In order to have the massage and the brushing carried out automatically, in accordance with a further aspect of the invention, the massage member and the brushing member comprise a robot arm construction by means of which it will be possible automatically to massage and/or brush the animal from its head to its rear end. According to a further inventive feature, the massage element and the brush are disposed near the end of a robot arm construction. In order to ensure that the massage element will be capable of adapting itself to the contours of the animal, according to a further inventive feature, the massage element is connected to the robot arm construction via a hinge. In accordance with a further inventive feature, the hinge is produced as a ball-and-socket joint comprising stop means with the aid of which the strike which the massage element is allowed to make relative to the robot arm construction is limited.

For the purpose of stimulating the animal even more intensively, according to an inventive feature, the surface of the massage element is produced as a profiled one. In a preferred embodiment in accordance with the invention, the profiled surface is constituted by ribs and/or knobs.

In accordance with a further aspect of the invention, the robot arm construction is disposed near the side of the milk box. According to a further inventive feature, the robot arm construction is fastened to the frame of the milk box. In order to make it possible to massage and/or brush the animal over its entire length, in accordance with an inventive feature, the construction comprises a longitudinal guide means, such as a rail, across which the massage member and/or the brushing member can be moved in the longitudinal direction of the animal. According to a further aspect of the invention, the massage member is provided with drive means with the aid of which the massage element can be set vibrating. In accordance with an inventive feature, there is disposed, near the end of the robot arm construction, a rotatably driven brush. According to again an other inventive feature, the massage element and a brush are capable of being driven at a variable speed. In order to make it possible that the animal is massaged and/or brushed on both sides, according to an inventive feature, on both sides of the milk box there are/is arranged a massage member and/or a brushing member.

In accordance with a further inventive feature, the construction comprises a computer which establishes whether an animal has much or little need for being massaged or cleaned by brushing for a short or a long time. According to an other inventive feature, the construction comprises a computer which has been programmed in such a manner that it is known whether the cow will be milked more or less quickly when being brushed or massaged or not. According to again an other inventive feature, the construction comprises a computer which has been programmed so as to record whether massaging has a more favourable influence on the cow than brushing. According to a further aspect of the invention, the construction comprises a computer which has been programmed in such a manner that it will be possible to establish, on the basis of milk samples, whether the massage and/or the brushing are/is carried out satisfactorily.

According to an other aspect of the invention, the rear side of the animal can be massaged by means of an

element which is driven in a diabolically rotating manner.

The invention further relates to a method of stimulating the milk yield of an animal to be milked, in which method, after an animal has occupied a box, the animal will optionally first be massaged automatically by means of a massage member or will first be brushed by means of a brushing member, or the animal will be massaged and brushed at the same time. According to a further aspect of the invention, during massaging and/or brushing an animal, teat cups are connected to the teats of the animal to be milked and the animal is subsequently milked. It has appeared that brushing and/or massaging result(s) in a quicker initiation of the milk flow of the animal. According to an inventive feature, the teat cups are automatically connected to the teats of an animal to be milked by means of a milking robot. According to a further inventive feature, by means of the massage member the animal is massaged beside the udder, preferably in front thereof. In accordance with an aspect of the invention, the massage member massages the rear end of the animal. According to an inventive feature, the brush is moved from the upper side of the back of an animal downwards until the abdomen of the animal. According to an aspect of the invention, after the brush has reached the abdomen of the animal, the number of revolutions at which the brush is rotating is automatically increased and the brush is subsequently moved back along the animal until the upper side of its back. In accordance with an inventive feature, the brushing member is automatically moved in the longitudinal direction of the animal for the purpose of brushing the animal stripwise. According to again an other inventive feature, the computer defines the duration of the massage depending on the type of animal.

For a better understanding of the invention, reference will now be made to the accompanying drawings, in which:

Figure 1 shows a side view of a box in which there are disposed massage members and brushing members;

Figure 2 shows a rear view of the box according to the line II-II in Figure 1;

Figure 3 shows to an enlarged scale a plan view of a massage element according to the arrow III in Figure 1;

Figure 4 is a cross-section of the massage element according to the line IV-IV in Figure 3, and

Figure 5 shows a rear view of an alternative box in which there is disposed one massage member.

Figure 1 shows a side view of an accommodation 1 for animals in which there is disposed a box 2. The box 2 comprises a frame 3 including stands 4 and joists 5 (Figure 1, 2). On the frame 3 there is further disposed a feed trough 6 in which fodder, such as concentrate, can be dispensed to the animals in the box 1 by means of a (non-shown) concentrate rationing system. The box 2 is further provided with a (non-shown) animal identification system by means of which an animal can be identified. For that purpose the animals are provided with a band 47 disposed around the leg, which band 47 comprises a responder that communicates with the animal identification system.

Between the stands 4, on both sides of the box 2 at approximately half the height of the box 2, there is disposed a longitudinal guide means 7 for a massage member 8. The longitudinal guide means 7 comprises two spaced apart box girders 9, of which the upper box girder 9 is provided at its upper side with a profiled edge 10 and the lower box girder 9 is provided at its lower side with a profiled edge 11. On the longitudinal guide means 7 there is disposed a robot arm construction 12 pertaining to the massage member 8. By means of an upper pair of wheels 13 and a lower pair of wheels 14 the robot arm construction 12 is suspended so as to be movable across the profiled edges 10, 11. Between the pairs of wheels 13 and 14 there is disposed a vertical beam 15, provided at its lower side with an arm 17 that is pivotable about a horizontal shaft 16. Near the horizontal shaft 16 the pivotable arm 17 is provided with a lever 18 whose end is rotatably coupled with a vertically arranged cylinder 19 whose other end is also rotatably connected to a lug 20 fastened to the vertical beam 15. Near its end the arm 17 is provided with a massage element 21. In Figures 3 and 4 the massage element 21 is shown to an enlarged scale. The massage

element 21 is connected to the arm 17 via a ball-and-socket joint 22. The ball-and-socket joint 22 is provided with (non-shown) blocking means, with the aid of which the strike which the massage element 21 is allowed to make relative to the arm 17 is limited. The massage element 21 comprises a square massage plate 23 made of a flexible material, such as rubber or synthetic material. The massage plate 23 is provided at its upper side with knobs 24. The massage element 21 can be set vibrating by means of a drive 25 disposed under the massage plate 23. The massage member 8 is further provided with a spraying device 26 by means of which warm or cold air, water or oil can be supplied to the massage element 21. The spraying device 26 comprises a spraying nozzle 27 disposed in the centre of the massage plate 23. Via a line 28 disposed in the arm 17 the warm or cold air, water, oil can be supplied to the spraying nozzle 27.

By means of the cylinder 19 the massage element 21 can be pivoted from its position outside the box indicated by broken lines to under the abdomen of an animal. By means of a motor 29 disposed on the upper pair of wheels 13 the massage member 8 can be moved in the longitudinal direction of the box 2 across the longitudinal guide means 7. It will thus be possible to massage the udder of the animal and every place desired therearound by means of the massage element 21.

As shown in Figures 1 and 2, the box 2 is further provided on both sides with a brushing member 30. The brushing member 30 is also movable in the longitudinal direction of the box 2 across a further longitudinal guide means 31 disposed on the frame 3 of the box 2. The further longitudinal guide means 31 comprises a profiled edge 32 disposed on the joists 5. The brushing member 30 comprises a further robot arm construction 33 which can be moved across the further longitudinal guide means 31 in the longitudinal direction of the milk box 2 by means of an upper pair of wheels 34 and a lower pair of wheels 35. Between the upper pair of wheels 34 and the lower pair of wheels 35 there is arranged a vertically extending box girder 36. At the lower end of the box girder 36 there is arranged a box girder 37 which is in a horizontal position and which extends from the

box 2 in outward direction. At the end of the horizontal box girder 37 there is arranged a step motor 38 provided with a horizontal shaft 39, which is firmly connected with a telescoping arm 40. At the end of the telescoping arm 40 there is disposed a second step motor 41 which is also provided with a horizontal shaft 42 connected with a further arm 43. At the end of the further arm 43 there is disposed a rotatably driven brush 44. The brush 44 is driven by a (non-shown) motor which is capable of being driven in two directions at a variable number of revolutions. By means of the aforementioned step motor and the telescoping arm 40 the brush 44 can be moved along the trunk of the animal from the position shown in bold lines in Figure 2 until the schematically shown position. By means of a step motor 45 disposed on the lower pair of wheels 25 it is possible to move the brush member 30 in the longitudinal direction of the box.

Figure 5 represents a further embodiment of a massage member 8 in accordance with the invention. Elements corresponding with those of the first embodiment are indicated by the same reference numerals. In Figure 5 the massage element 21 of the massage member 8 is designed as a diabolic roller element 46. By means of a (non-shown) motor the diabolic roller element 46 can be driven in two directions. With the aid of the diabolic roller element 46 the rear side of the animal can be massaged. It will also be possible to set the diabolic roller element 46 vibrating. In a (non-shown) embodiment it will be possible as well to move the diabolic roller element 46 vertically along the rear side of the animal.

CLAIMS

1. A construction including an accommodation (1) for animals, such as cows, characterized in that the accommodation (1) comprises a massage member (8) and a brushing member (30) for automatically massaging or brushing an animal simultaneously and/or alternately.

2. A construction as claimed in claim 1, characterized in that the massage member (8) is designed in such a way that the animal is massaged automatically at its upper side and/or underside and/or rear side.

3. A construction including an accommodation for animals, such as cows, characterized in that the accommodation (1) comprises a massage member (8) which is designed in such a way that the animal is massaged automatically at its upper side and/or underside and/or rear side during a time which is regulated by the computer.

4. A construction as claimed in any one of the preceding claims, characterized in that the accommodation (1) comprises at least one milk box (2), and the massage member (8) and/or the brushing member (30) are/is disposed on the milk box (2) or near thereto in such a manner that it will be possible to massage or brush the rear end of the animal.

5. A construction including an accommodation for animals, such as cows, characterized in that the accommodation (1) comprises at least one milk box (2), and the massage member (8) and/or the brushing member (30) are/is disposed on the milk box (2) or near thereto in such a manner that it will be possible to massage or brush the rear end of the animal.

6. A construction as claimed in any one of the preceding claims, characterized in that the massage member (8) comprises a massage element (21) which is made of flexible material, such as synthetic material or rubber.

7. A construction as claimed in any one of the preceding claims, characterized in that the massage and/or the brushing member (8, 30) comprise(s) a device (26) by means of which it will be possible, in a cold season, to supply automatically warm air, water or oil during massaging

and/or brushing.

8. A construction as claimed in any one of the preceding claims, characterized in that the massage member (8) and the brushing member (30) comprise a robot arm construction (12, 23) by means of which it will be possible to massage and/or brush an animal automatically from its head to its rear end.

9. A construction as claimed in claim 8, characterized in that the massage element (21) and the brush (44) are disposed near the end of the robot arm construction.

10. A construction as claimed in claim 9, characterized in that the massage element (21) is connected to the robot arm construction (12) via a hinge (22) so as to be capable of adapting itself to the unevennesses of the body of the animal.

11. A construction as claimed in claim 10, characterized in that the hinge (22) is a ball-and-socket joint comprising stop means with the aid of which the strike which the massage element (21) is allowed to make relative to the robot arm construction (12) is limited.

12. A construction as claimed in any one of the preceding claims, characterized in that the massage element (21) has a profiled surface.

13. A construction as claimed in claim 12, characterized in that the profiled surface is constituted by ribs and/or knobs (24).

14. A construction as claimed in any one of the preceding claims, characterized in that the robot arm construction (12, 33) is disposed near the side of the milk box (2).

15. A construction as claimed in claim 14, characterized in that the robot arm construction (12, 33) is fastened to the frame (3) of the milk box (2).

16. A construction as claimed in any one of the preceding claims, characterized in that the construction comprises a longitudinal guide means (7, 31), such as a rail, across which the massage member (8) and/or the brushing member (30) can be moved in the longitudinal direction of the animal.

17. A construction as claimed in any one of the preceding claims, characterized in that the massage member (8) is provided with drive means (25) with the aid of which the massage element (21) can be set vibrating.

18. A construction as claimed in claim 8 or any one of claims 14 to 16, characterized in that there is disposed, near the end of the robot arm construction (33), a rotatably driven brush (44).

19. A construction as claimed in claim 17 or 18, characterized in that the brush and the massage element (44, 21) are capable of being driven at a variable speed.

20. A construction as claimed in any one of the preceding claims, characterized in that on both sides of the milk box (2) there are/is arranged a massage member (8) and/or a brushing member (30).

21. A construction as claimed in any one of the preceding claims, characterized in that the construction comprises a computer which establishes whether an animal has much or little need for being massaged or cleaned by brushing for a short or a long time.

22. A construction as claimed in any one of the preceding claims, characterized in that the construction comprises a computer which has been programmed in such a manner that it is known whether the cow will be milked more or less quickly when being brushed or massaged or not.

23. A construction as claimed in any one of the preceding claims, characterized in that the construction comprises a computer which has been programmed so as to record whether the massage has a more favourable influence on the cow than the brushing.

24. A construction as claimed in any one of the preceding claims, characterized in that the construction comprises a computer which has been programmed in such a manner that it will be possible to establish, on the basis of milk samples, whether the massage and/or the brushing are/is carried out satisfactorily.

25. A method of stimulating the milk yield of an animal, in which method, after an animal has occupied a box, the animal will optionally first be massaged automatically by

means of a massage member (8) or will first be brushed.

26. A method of stimulating the milk yield of an animal, characterized in that, during massaging and/or brushing the animal, teat cups are connected to the teats of the animal to be milked and the animal is subsequently milked.

27. A method as claimed in claim 25 or 26, characterized in that the teat cups are automatically connected to the teats of the animal to be milked by means of a milking robot.

28. A method as claimed in any one of claims 25 to 27, characterized in that by means of the massage member (8) the animal is massaged beside the udder.

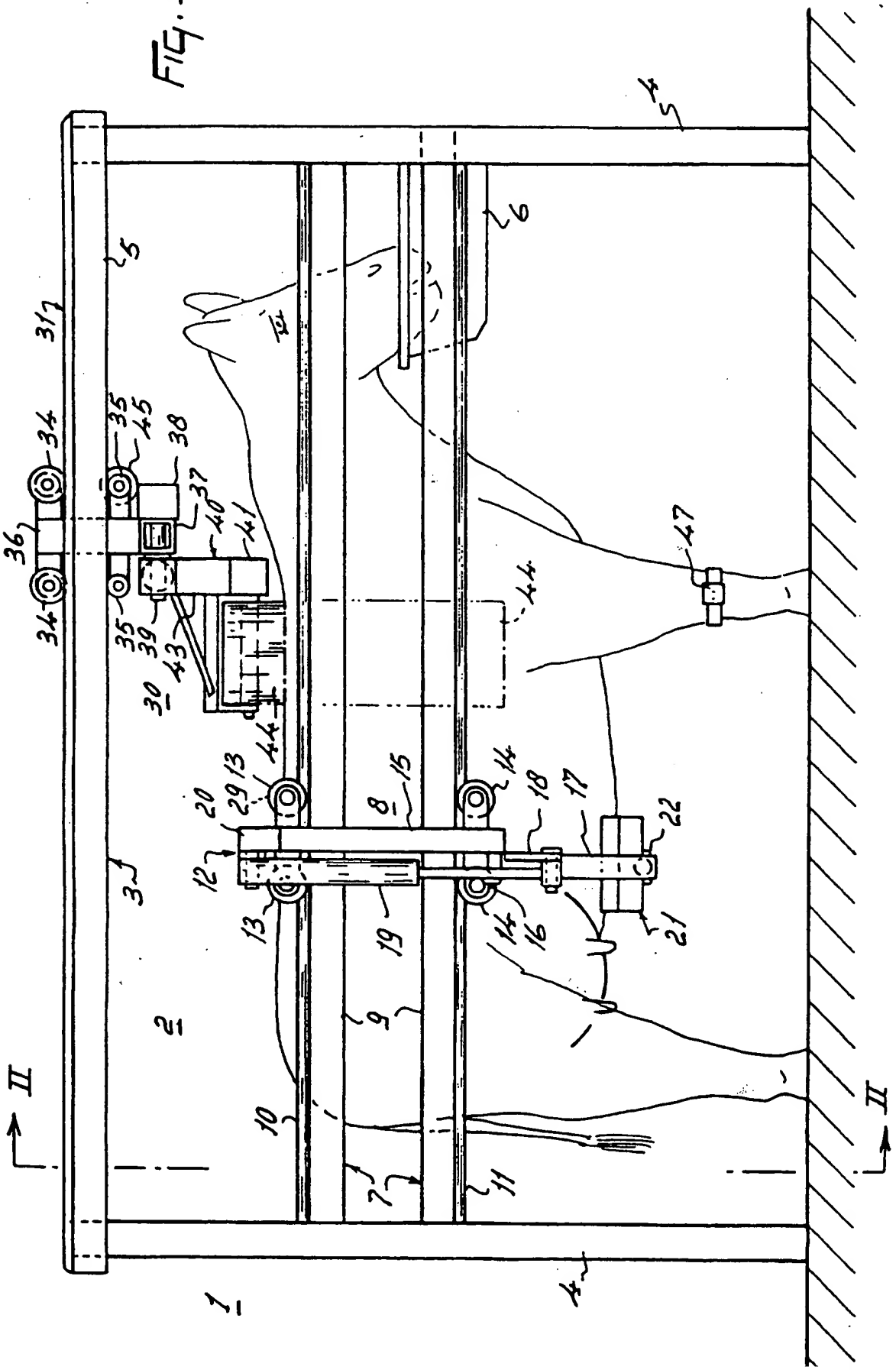
29. A method as claimed in any one of claims 25 to 28, characterized in that the massage member (8) massages the rear end of the animal.

30. A method as claimed in any one of claims 25 to 29, characterized in that the brush (44) is moved from the upper side of the back of the animal downwards until the abdomen of the animal.

31. A method as claimed in claim 30, characterized in that, after the brush (44) has reached the abdomen of the animal, the number of revolutions at which the brush (44) is rotating is automatically increased, and the brush (44) is subsequently moved back along the animal until the upper side of its back.

32. A method as claimed in claim 30 or 31, characterized in that the massage member (8) massages automatically, while the duration of the massage is defined by the computer, depending on the type of animal.

FIG. 1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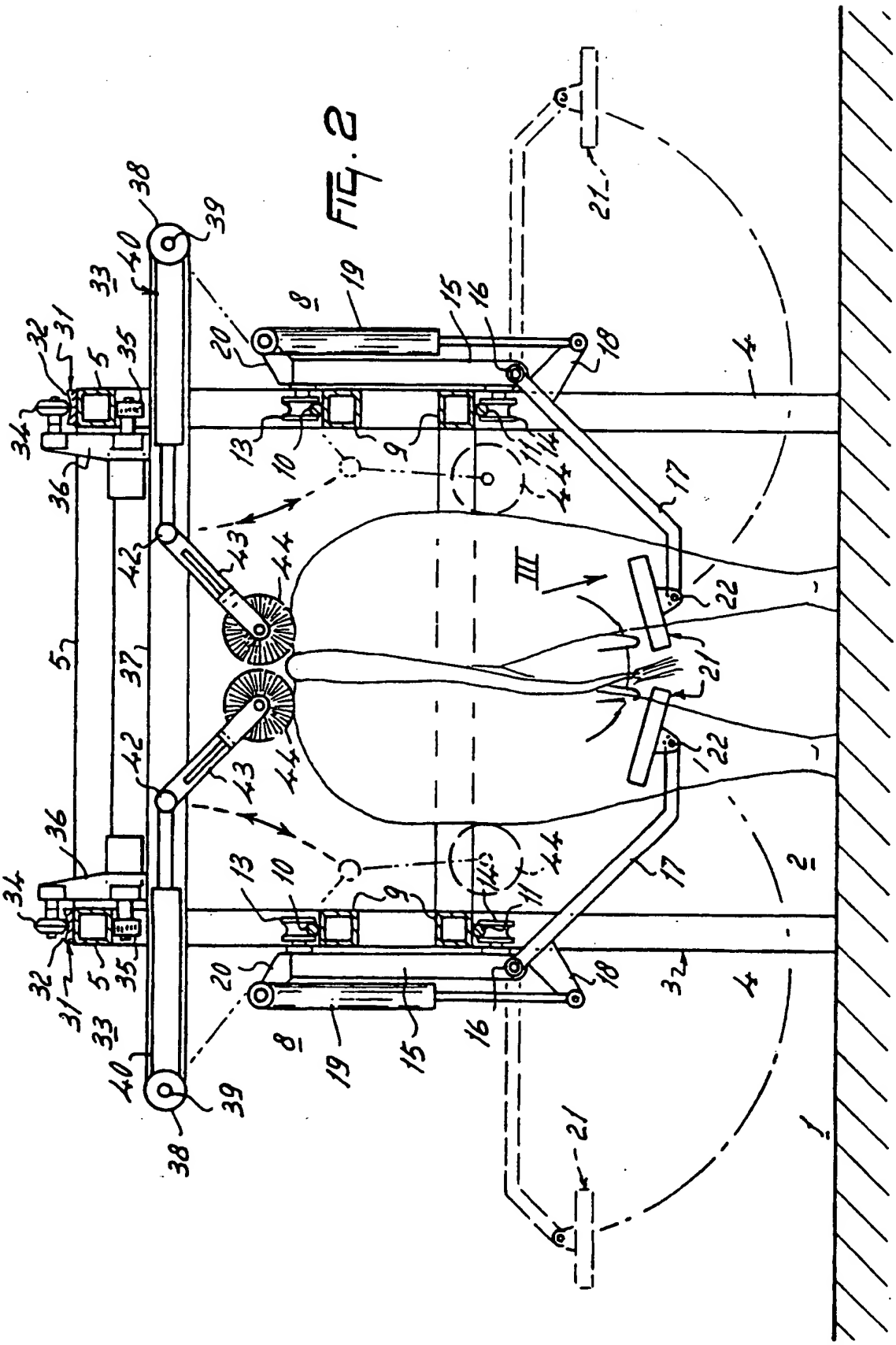
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FIG. 2

FIG. 5

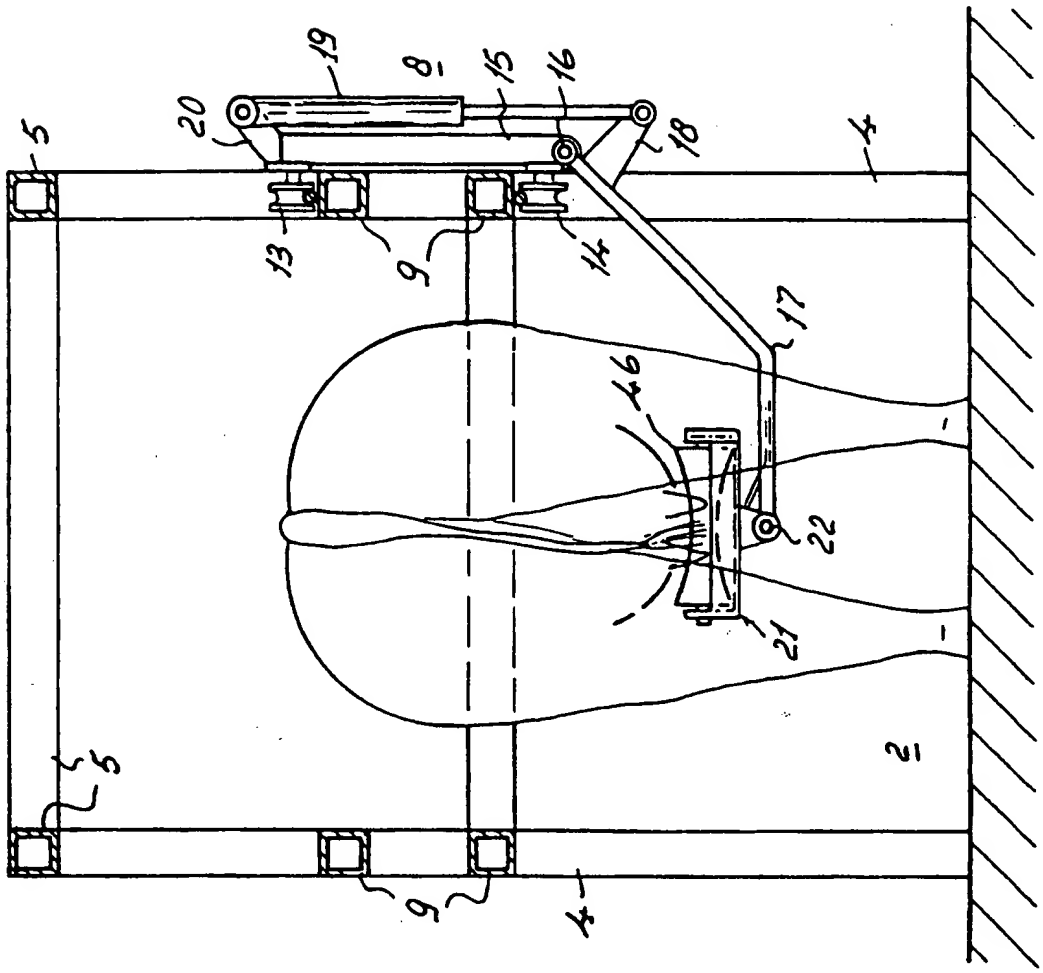


FIG. 3

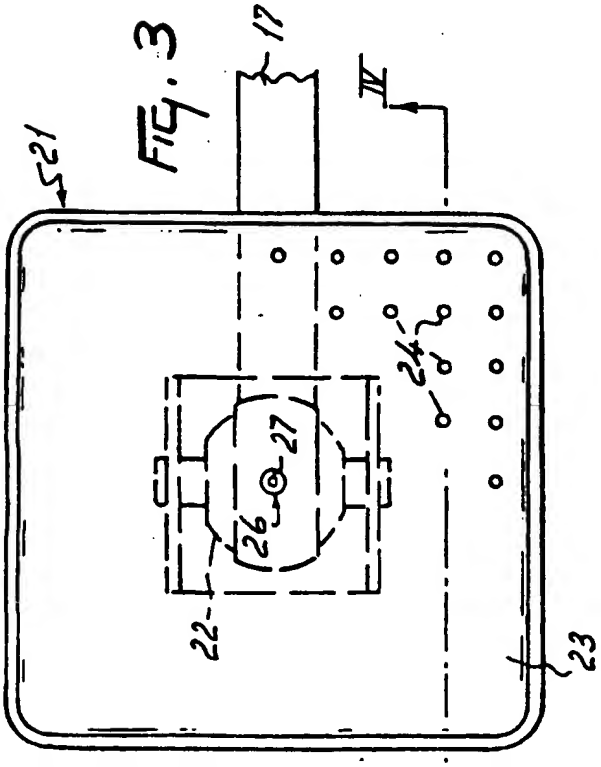
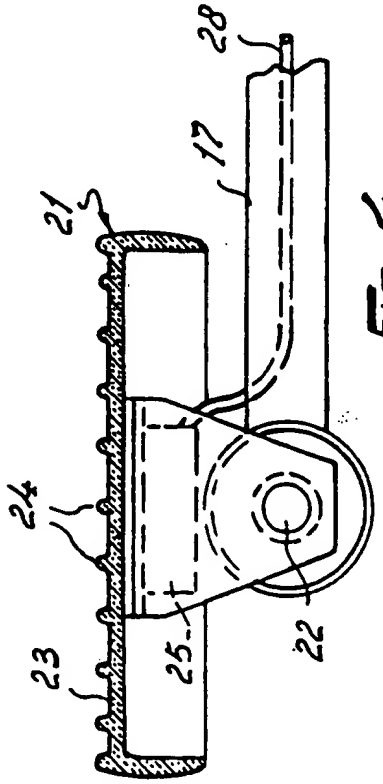


FIG. 4



INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 97/00278

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A01J5/017 A01K1/12 A01K13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A01J A01K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 638 232 A (MAASLAND NV) 15 February 1995 see column 2, line 49 - line 55 see column 3, line 57 - column 4, line 35 ---	1
A	EP 0 634 097 A (TEXAS INDUSTRIES INC) 18 January 1995 see column 1, line 4 - line 40 see column 2, line 32 - line 39 see column 2, line 51 - column 3, line 7 see column 3, line 52 - column 4, line 56 see claims 15,16; figures --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
19 August 1997	05. 09. 97

Name and mailing address of the ISA	Authorized officer
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International Application No
PCT/NL 97/00278

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 630 558 A (TEXAS INDUSTRIES INC) 28 December 1994 see column 1, line 26 - line 54 see column 2, line 2 - line 9 see column 2, line 51 - column 3, line 45 see column 4, line 14 - column 7, line 19 see column 8, line 30 - line 57 see column 10, line 42 - column 11, line 20 see column 11, line 40 - column 12, line 4 see claims 19,20,22,23; figures ---	1
A	EP 0 091 892 A (ALFA LAVAL AB) 19 October 1983 see page 3, line 13 - line 15 see page 6, line 1 - line 8 see page 8, line 4 - line 7 see claim 3 -----	1

INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 97/00278

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0638232 A	15-02-95	NL 9301378 A	01-03-95
EP 0634097 A	18-01-95	NL 9301214 A	01-02-95
EP 0630558 A	28-12-94	NL 9301098 A	16-01-95
EP 0091892 A	19-10-83	SE 430559 B	28-11-83
		DE 3378349 A	08-12-88
		SE 8202278 A	09-10-83
		US 4508058 A	02-04-85